

WHAT IS CLAIMED IS:

1. An apparatus for mixing fluids, said apparatus comprising:
 - (a) a housing having an interior channel with capillary dimensions,
 - 5 (b) a structural member in said interior channel adjacent an end thereof, the dimensions of and placement of said structural member being sufficient such that intermittent application of centrifugal force to said interior causes movement of said fluid in said channel without exit thereof, and
 - (c) a mechanism that intermittently generates centrifugal force on the interior
 - 10 of said housing to cause movement of said fluid in said channel without exit thereof.
2. An apparatus according to Claim 1 wherein said rotatable member is a circular tray.
- 15 3. An apparatus according to Claim 1 wherein said housing further comprises a mixing area in fluid communication with said interior channel.
4. An apparatus according to Claim 1 wherein said interior channel comprises a linear array of features for conducting chemical reactions.
- 20 5. An apparatus according to Claim 4 wherein said features comprise biopolymers.
6. An apparatus according to Claim 4 wherein said linear array is a linear
- 25 microarray.
7. An apparatus for conducting hybridization reactions, said apparatus comprising:
 - (a) a housing having an interior channel with capillary dimensions, said
 - 30 interior channel comprising a linear microarray of biopolymers for conducting hybridization reactions and a mixing area,
 - (b) a structural member in said interior channel adjacent an end thereof, the

dimensions of and placement of said structural member being sufficient such that intermittent application of centrifugal force to said interior channel causes movement of said fluid in said interior channel between said linear microarray and said mixing area without exit of fluid from said interior channel, and

- 5 (c) a mechanism that intermittently generates centrifugal force on the interior of said housing to cause movement of said fluid in said interior channel between said linear microarray and said mixing area without exit of fluid from said interior channel.

8. An apparatus according to Claim 7 further comprising a fluid dispensing
10 device.

9. An apparatus according to Claim 7 wherein said biopolymers are polynucleotides or polypeptides.

15 10. An apparatus according to Claim 7 wherein said mechanism comprises a rotatable support for rotating said housing to produce said centrifugal force.

11. An apparatus according to Claim 10 wherein said rotatable support is a circular tray driven by a motor.

20

12. A method for mixing a fluid, said method comprising:

(a) introducing a fluid into a housing of an apparatus according to Claim 1,
and

(b) generating intermittent centrifugal force to cause movement of said fluid
25 but insufficient to cause said fluid to exit said housing.

13. A method according to Claim 12 wherein said intermittent centrifugal force is generated by rotating said mechanism.

30 14. A method for conducting chemical reactions, said method comprising:
(a) introducing a sample into a housing of an apparatus according to Claim 4,
and

(b) incubating said sample in said housing under conditions for carrying out said chemical reactions and during said incubation generating intermittent centrifugal force to cause movement of said fluid between said linear array and said mixing area but insufficient to cause said fluid to exit said interior channel.

5

15. A method according to Claim 14 wherein said intermittent centrifugal force is generated by rotating said housing.

16. A method for conducting hybridization reactions, said method
10 comprising:

(a) introducing a sample into a housing comprising a linear microarray of features for hybridizing to analytes in said sample, said housing having internal capillary dimensions, a mixing area separate from said linear array and a structural member in said interior adjacent an end thereof, the dimensions of and placement of said structural
15 member being sufficient such that intermittent application of centrifugal force to said interior causes motion of said fluid therein, and

(b) incubating said sample in said housing under conditions for carrying out said hybridization reactions and during said incubation generating intermittent centrifugal force to cause reciprocal movement of said fluid between said linear array
20 and said mixing area but insufficient to cause said fluid to exit said housing.

17. A method according to Claim 16 wherein said intermittent centrifugal force is generated by rotating said housing.

25 18. A method according to Claim 16 further comprising, subsequent to said incubation, increasing said centrifugal force sufficient to cause said fluid to exit said interior.

30 19. A method according to Claim 18 further comprising introducing a wash fluid into said housing and generating intermittent centrifugal force sufficient to cause agitation of said wash fluid but insufficient to cause said wash fluid to exit said housing

20. A method according to Claim 19 further comprising increasing said centrifugal force sufficient to cause said fluid to exit said interior.

21. A method according to Claim 16 further comprising examining said
5 linear array for the results of said hybridization reactions.

22. A method according to Claim 16 wherein said housing is part of a microfluidic system.

10 23. A method according to Claim 16 wherein said housing is a channel in a microfluidic system.

24. A method according to Claim 16 wherein said features are biopolymers.

15 25. A method according to Claim 16 wherein said features are polynucleotides or polypeptides.

26. A method according to Claim 16 wherein said linear microarray comprises at least ten features.

20 27. A method according to Claim 21 comprising forwarding data representing a result obtained from said examining.

28. A method according to Claim 27 wherein the data is transmitted to a
25 remote location.

29. A method according to claim 21 comprising receiving data representing a result of an interrogation obtained by said examining.

30